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Summary of: Work Hours Instability in Canada

by Andrew Heisz and Sébastien LaRochelle-Côté

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1. Introduction

In Canada, the share of workers with standard-length workweeks, usually defined as 35 to 40 hours per week, has declined. In 1978, 47.4% of workers worked between 35 and 40 hours per week, 43.4% did so in 1989, and 39.4% in 2000. The share of those working less than 35 hours was steady between 1978 and 1989 but rose from 30.8% in 1987 to 34.1% in 2000, while the share working longer hours went from 23.0% in 1978, to 25.8% in 1989, and ended the 1990's at 26.4%.

It is often argued that these movements away from standard work hours have led to substantial declines in the well-being of individuals, and this for several reasons. First, those working short hours are more likely to face poor employment standards, less likely to be unionized, and less protected against job layoff (Chaykowski, 2005). They also have lower wages (Morissette, 1995), lower skills (Johnson and Kuhn, 2004), and less access to employment insurance (Fleury and Fortin, 2004). Non-standard work hours are also linked to stress: individuals not working enough may experience stress because low hours are often associated with low wages or job instability (Scott, Tompa and Trevithick, 2004; Dolinschi, Tompa and Bhattacharyya, 2004; Ferrie, Shipley, Marmot, Stansfeld and Smith 1998; Friedland and Price, 2003) and individuals working too much may also experience stress due to job demands, lack of leisure time, and lack of quality time with family and friends (Frederick and Fast, 1996). Finally, both overwork (Crompton, 1995) and underemployment (Scott, Tompa and Trevithick, 2004) are associated with adverse health consequences.

The polarization in work hours and the associated outcomes have led a number of commentators to emphasize the benefits and costs of alternative working arrangements. However, it is not known whether a person's position in the working hours distribution stays the same from year to year. It might be that the apparent polarization of work hours is partly the result of workers having highly variable work hours—that is, working standard hours in some periods and long or short hours in other periods. If this were the case, then the importance of hours polarization might be overstated, and more attention should be paid to individual-level hours variation.

In this paper, we investigate individual-level variability in work hours. We describe the amount of individual-level hours variation observed among a panel of workers from 1997 to 2001. In doing so, we estimate the share of the cross-sectional variance in work hours that is attributable to hours instability at the individual level, and describe the persistence of standard, long, and short hours of work. Then, we examine the well-being characteristics of workers defined according to their longitudinal working hours patterns with a view to determining whether workers choose to work variable hours or whether they do so because they are unable to secure more stable employment.

2. Data

We use the 1996 to 2001 longitudinal panel of the Survey of Labour and Income Dynamics (SLID).[1] In this survey, respondents are asked in each year to describe their work schedules, which are then aggregated into a figure for annual working hours. In SLID, hours worked are

1. This corresponds to the most recent 6-year panel available. Our focus is on annual hours over the period 1997 to 2001, but we use the first year of the panel to identify some personal and employer characteristics among workers.

collected by asking paid workers how many hours they "usually" get paid in a typical workweek. The focus is on a sample of approximately 8,100 individuals aged 25 to 54 in 1997, who worked on at least one occasion between 1997 and 2001. New immigrants who arrived after 1996, individuals who left the country before 2001, individuals not physically located in the country at any point over the period, and self-employed workers were excluded.

3. Work hours instability: cross-sectional results

Table 1 shows the cross-sectional distributions for 1997 and 2001. A substantial portion of workers in the sample worked standard hours (52.5% in 1997 and 57.2% in 2001). The proportion working very long hours (2,400 or more hours per year) was relatively large, especially among men: 11.4% of all paid men worked at least this many hours in 2001 compared with 8.0% of all said workers. The distribution of work hours remained relatively stable over time, except for a small shift away from low part-time hours towards full-year full-time employment (especially among women). These results suggest that overwork is stable over time.

However, only 50.6% of workers in this cohort worked in the same interval of work hours in 2001 as they did in 1997. Consistent with the growing economy, more (27.7%) moved to a higher class of hours than to a lower class (21.7%). Nearly half changed hours-classes over the five-year period, indicating substantial mobility in work hours. The share of workers working the same hours-classes in 2001 as in 1997 was higher for men than for women: 55.3% of men and 45.9% of women worked the same class of hours in 2001 and in 1997. Among workers who changed classes, women were more likely to move up: 30.6% moved up, compared with 24.9% of men.

Of all full-year full-time workers in 1997, nearly 75% were still full-year full-time in 2001. In addition, 35.2% of the "overworked" (2,400 hours or more) in 1997 were overworked again in 2001. But there was substantial mobility. Among the overworked in 1997, two-thirds worked a shorter class of hours in 2001: 43.6% worked full-time hours in 2001, and 12.9% worked less than full-time hours. The flight from overwork was larger for women than men. Among women who worked more than 2,400 hours in 1997, 70.4% shifted down to standard or part-time hours by 2001, compared with 52.0% among men.

Table 2 shows the persistence of standard (between 1,750 and 2,400 hours), long (at least 2,400 hours) and short hours (less than 1,750 hours) in the period from 1997 to 2001, ranging from one occurrence in the 5 years, to persistence over all 5 years. The "standard hours" category was the most stable pattern, especially among men. Almost one-third of all workers (and 40.2% of men) worked between 1,750 and 2,400 hours in all 5 years of the panel, and 1 in 2 workers worked standard hours in at least 4 years of the 5-year panel.

Long hours were less persistent. About 8.0% of the panel worked 2,400 or more hours in 2001; but 20.3% worked long hours in some year between 1997 and 2001, indicating that the share of workers having some experience working long hours is much larger than cross-sectional results suggest. Nevertheless, only 0.7% of the panel worked this much in all of the five years, indicating that chronic overwork is extremely rare. Men were more likely to be overworked than women.

Many workers (55.4%) worked fewer than 1,750 hours on at least one year between 1997 and 2001 and the distribution was skewed: 15.3% worked less than 1,750 hours in only 1 year, and

14.7% worked fewer than 1,750 hours in all 5 years. Period-long spells of underwork were much less prevalent among men (5.2%) than women (24.4%).

To determine how much a typical individual's annual work hours vary, we compute the mean absolute deviation (MAD) for each worker. Results indicate that 75% typically diverted from their average hours by more than 1.5 standard weeks of work (65 hours). And 50% had an average variation in hours of more than 202 hours (5 weeks), while 25% had an annual hours-variation of at least 443 hours (10 weeks). Variation was much higher among women.

This discussion suggests that there are two sources of working hours inequality: *permanent* differences in working hours *between* people, and *transitory* differences in working hours *within* people. In the first, different workers can be characterized as having very different levels of work hours, even when their respective annual work hours are averaged over long periods of time. In the second, from year to year, workers experience variation in their own working hours. Both sources are important for explaining annual earnings inequality.

To determine how much of the cross-sectional variation in work hours can be attributed to individual instability, and how much to inequality between individuals, we apply the method of variance decomposition developed by Gottschalk and Moffit (1994) to decompose earnings inequality. We find that 42.7% of the total variation in work hours can be attributed to individual-level instability in hours, while the remaining 57.3% is attributable to inequality between individuals. This share was higher among men (50.8%) than women (43.1%). The estimates suggest that the variance attributable to individual-level instability is high in annual work hours.

4. Longitudinal patterns in work hours, job quality and well-being

To examine whether this instability in work hours is a cause for concern, we split the sample according to their working-hours patterns and looked at their characteristics. We divide workers into 4 groups: (1) "always standard" (those with hours between 1,750 and 2,400 hours every year); (2) "overworked" (at least one year with more than 2,400 hours without ever going below 1,750); (3) "underemployed" (at least one year with less than 1,750 hours without ever going above 2,400); and (4) "hi-lo" (at least one year with more than 2,400 hours and at least another year with fewer than 1,750). The latter identifies workers whose working hours were particularly variable: "overtime" in some years, "part-time" in others.

Almost one-third of workers worked "always standard" hours, averaging 2,027 hours per year (about 40 hours a week), and with little instability in work hours over time. But as many as 13.3% worked more than 2,400 hours in at least one year without ever going under 1,750 hours. These "overworked" individuals worked more intensely than any other category, supplying, on average, 400 more hours per year than in the "always standard" category.

Over 43% of workers in the sample worked fewer than 1,750 hours without ever going above 2,400 hours. The "underemployed" individuals formed the largest group, and averaged approximately 34 weeks of full-time work per year over the five-year panel. Hours varied substantially from one year to the next—more than for workers in the "always standard" or "overworked" categories.

About 7.8% of paid workers fell into the "hi-lo" group. On an annual basis, hi-lo workers supplied almost as many hours (1,978 hours) as those who worked a standard full-year full-time schedule in each year. Thus, this group, through averaging years of overwork with years of underemployment, achieved approximately a standard work schedule. But this came at the cost of much more hours instability: they often experienced an annual variation of more than 10 weeks (420 hours), and they had higher annual work hours instability. Overall, men were much more likely to work standard or above standard hours, and women were more likely to work below standard. They were equally likely to be in the hi-lo category.

In the remainder of this report, we compare various indicators of job quality and well-being across these four work hours intensity groups. The objective is to determine if having highly variable work hours, which we proxy as being in the hi-lo category, is associated with having low job quality or well-being, thereby making it difficult to argue that variable work hours is a choice for most.

Work hours and job quality

The job quality literature often divides the labour market into "good" and "bad" jobs.[2] Good jobs have stable full-time hours, pension coverage and stability, while bad jobs do not. But to what extent is having a bad job associated with highly variable work hours? Specifically, having a pension plan, being in a union are each associated with less hours variability. In contrast, being a multiple job holder, a job changer, or a non-manager and having low wages are all associated with highly variable work hours. Hence, most indicators of job quality are negatively associated with hours variability.

Work hours and well-being

We use the following to proxy well-being: experiencing low-income at least once over the period; having bottom quartile or bottom decile average earnings; having a high level of stress at least once over the period; and experiencing bad health at least once over the period.

Hours variability was associated with having one or more spells of low income over the period: 15.8% of hi-lo workers experienced at least one year of low income compared with 3.3% of standard workers. Having hi-lo work was also associated with having low average annual earnings over the period: 24.4% of hi-lo workers had bottom quartile annual earnings, compared with 9.3% of standard workers. Thus, hi-lo workers are not maintaining a particularly high standard of living through averaging periods of overwork and underwork. Hi-lo work is more associated with low average earnings for men than women.

The incidence of stress was highest among those in the overworked category, but it is nearly as high in the hi-lo category. Moreover, workers with hi-lo hours had much higher incidences of stress than standard workers; 50.5% of hi-lo workers experienced stress compared to 37.6% of standard workers.

The incidence of bad health was also associated with working hours patterns. While the incidence of bad health was highest among underemployed workers, it was nearly as high for hi-lo workers. Hi-lo workers had a much higher incidence of bad health than workers who always

2. See Gunderson and Riddell (2000) for a recent review of the Canadian job quality literature.

worked standard hours: 19.7% of hi-lo workers experienced bad health compared to 15.6% of standard-hours workers.

To test whether the relationship between working hours variability and stress or bad health is spurious, we perform a number of regressions, controlling for such background characteristics as demographic factors, industry of employment, and job quality factors. The regressions include a series of variables designed to assess the well-being of the individual at the beginning of the period, including a dummy variable indicating whether the person lived in a low-income family in 1996, was very stressed in 1996, or was in bad health in 1996. Finally, the models include the mean annual hours observed over the 1997 to 2001 period, to account for the likelihood that stress and bad health are related to the levels of hours worked.

After controlling for a variety of background characteristics, being overworked and being in the hi-lo group have roughly equal positive influences on stress. This is also true when men and women are examined separately. Hours variability remains important when we enter it directly into the model, either as the coefficient of variation (CV) or as the mean absolute deviation (MAD) of hours. The results for bad health are less consistent. Being in the hi-lo group is weakly associated with having bad health for all workers after other controls are added in. This effect is more concentrated among women: being in the hi-lo group was significant only for women. Having high MAD of hours was associated with having bad health for men and women; having a high CV of hours was only significant for men.

After controlling for initial well-being, industry of employment, job quality, and demographics, the results show that hi-lo workers had an incidence of stress that was 34% higher than workers who always worked standard hours, making them just as stressed as the overworked. Under the alternate specification, it was found that workers with the highest MAD had an incidence of stress that was 28% higher than those with the lowest hours variability. These "stress premiums" were comparable for men and women. Hi-lo workers' incidence of bad health was 23% higher than standard-hours workers; this difference was more pronounced for women. Women hi-lo workers' incidence of bad health was 36% higher than women standard-hours workers. Workers with the highest MAD of work hours were 29% more likely to have bad health than those with the least hours variability, again more pronounced among women than men. Thus, having variable work hours is related to lower levels of well-being.

5. Conclusion

Using data from the Survey of Labour and Income Dynamics, we find that workers face substantial variability in work hours; only about half worked the same class of hours in 2001 as in 1997, and the amount of variance attributable to individual-level instability in work hours can be relatively large. In addition, while many workers have periods where they work long hours, long-term periods of overwork are rare. Further, a significant minority of workers maintain approximately full-year full-time hours through averaging periods of overwork with periods of underemployment: they face among the most variable of work hours.

Workers with lower job quality have more unstable work hours, and workers in non-standard or low-wage work have more variable work hours. Interestingly, workers with highly variable work hours also have higher incidences of low income and are more likely to report being very stressed or in bad health.

Our results imply: (1) that research on working time inequality should pay more attention to individual level hours instability; (2) the lack of persistence in long work hours, plus the high level of individual hours variability, undermine the equity-based arguments behind working-time reduction policies; (3) labour market policies designed to mitigate the hardships caused by low quality or non-standard work should consider that these workers also tend to work unstable hours; (4) policies designed to reduce working-hours variability, and not just reduce working time, could benefit workers.

Table 1 Distribution of workers (in percentage), 1997 and 2001

	1997	2001	Change
All individuals			
Non-workers	7.0	5.9	-1.1
1 to 1,199 hours	16.7	12.8	-3.9
1,200 to 1,749 hours	11.4	11.9	+0.5
1,750 to 2,199 hours	52.5	57.2	+4.7
2,200 to 2,399 hours	4.8	4.2	-0.6
2,400 hours and more	7.6	8.0	+0.4
Men			
Non-workers	4.6	3.6	-1.0
1 to 1,199 hours	9.8	6.5	-3.3
1,200 to 1,749 hours	7.2	6.3	-0.9
1,750 to 2,199 hours	60.8	66.0	+5.2
2,200 to 2,399 hours	6.3	6.1	-0.2
2,400 hours and more	11.3	11.4	+0.1
Women			
Non-workers	9.5	8.2	-1.3
1 to 1,199 hours	23.7	19.2	-4.5
1,200 to 1,749 hours	15.7	17.6	+1.9
1,750 to 2,199 hours	44.0	48.1	+4.1
2,200 to 2,399 hours	3.2	2.3	-0.9
2,400 hours and more	3.8	4.5	+0.7

Source: Survey of Labour and Income Dynamics, Statistics Canada.

Table 2 Persistence of standard, long and short hours, 1997-2001 (in percentage)

Workers	# Years	% working between 1,750 and 2,400 hours (standard)	% working 2,400 hours and more	% working less than 1,750 hours
All individuals	1	11.1	11.0	15.3
	2	10.9	4.6	9.1
	3	11.8	2.6	8.0
	4	17.3	1.4	8.3
	5	32.2	0.7	14.7
Total		83.3	20.3	55.4
Men	1	9.2	14.8	15.6
	2	10.6	6.5	7.6
	3	12.1	3.8	6.2
	4	20.2	2.5	5.2
	5	40.2	1.2	5.2
Total		92.3	28.8	39.8
Women	1	13.0	7.2	15.1
	2	11.2	2.7	10.6
	3	11.4	1.4	9.8
	4	14.4	0.4	11.4
	5	24.1	0.2	24.4
Total		74.1	11.9	71.3

Source: Survey of Labour and Income Dynamics, Statistics Canada.

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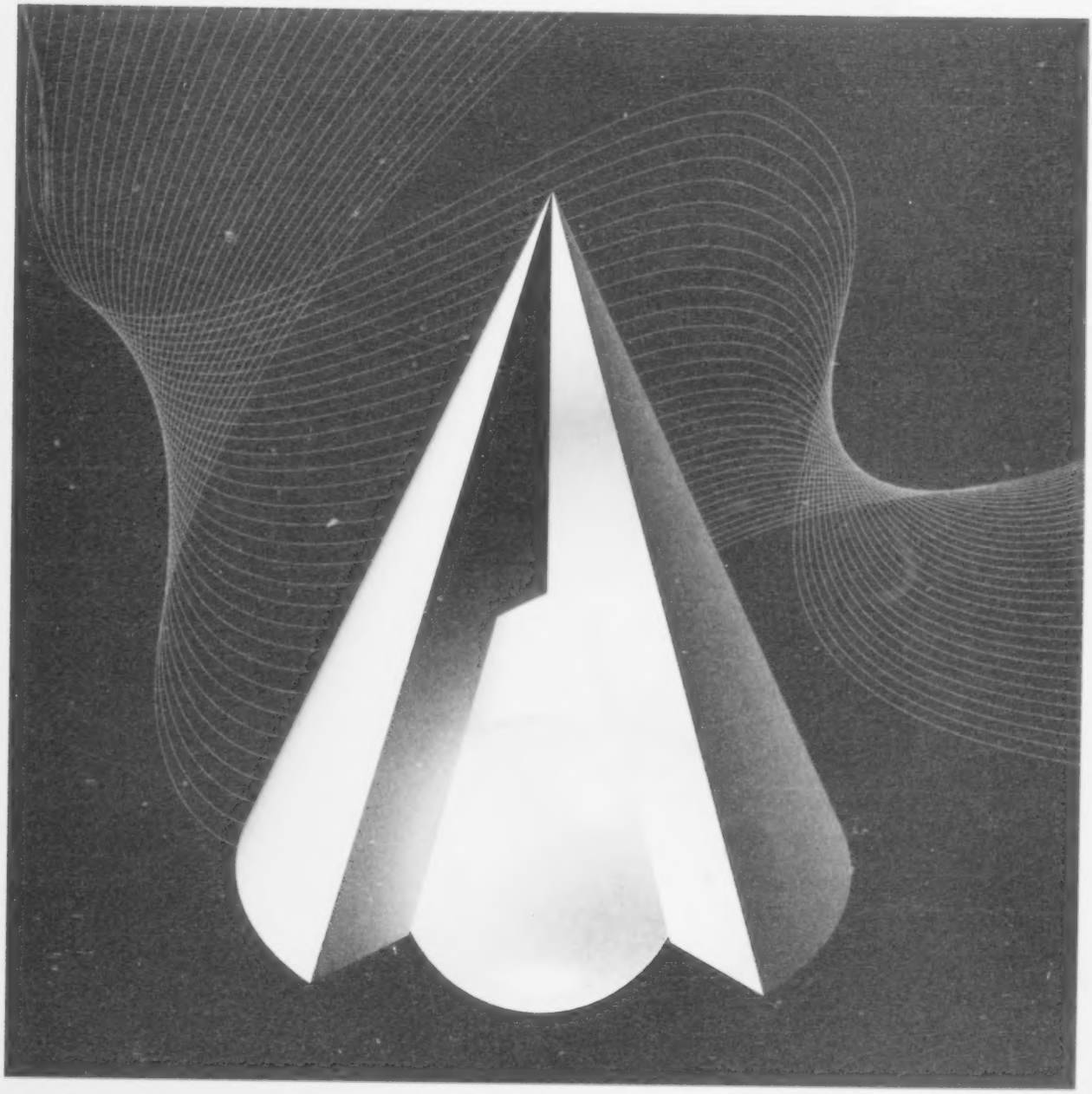

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Abstract

Numerous studies of working hours have drawn important conclusions from cross-sectional surveys. For example, the share of individuals working long hours is quite large at any given point in time. Moreover, this appears to have increased over the past two decades, raising the call for policies designed to alleviate working hours discrepancies among workers, or reduce working time overall. However, if work hours vary substantially at the individual level over time, then conclusions based upon studies of cross-sectional data may be incomplete. Using longitudinal data from the Canadian Survey of Labour and Income Dynamics, we find that there is substantial variation in annual working hours at the individual level. In fact, as much as half of the cross-sectional inequality in annual work hours can be explained by individual-level instability in hours. Moreover, very few individuals work chronically long hours. Instability in work hours is shown to be related to low-job quality, non-standard work, low-income levels, stress and bad health. This indicates that working variable work hours is not likely done by choice; rather, it is more likely that these workers are unable to secure more stable employment. The lack of persistence in long work hours, plus the high level of individual work hours instability undermines the equity based arguments behind working time reduction policies. Furthermore, this research points out that policies designed to reduce hours instability could benefit workers.

Keywords: Hours variability, overwork, underemployment, well-being, stress, low income, health.

1. Introduction

In recent years, the increasing polarization of work hours in Canada has been the focus of a substantial body of research. Indeed, it has been argued that the rise in the share of jobs with either substantially shorter or longer hours at the expense of the weekly full-time norm indicates an important decline in job quality. Some have argued that movements away from standard work hours have led to substantial changes in the quality of life of individuals, thus requiring policy intervention.

Much of this discussion on work hours was driven by the results of cross-sectional studies. However, these studies do not tell us whether a person's position in the working hours distribution stays the same from year to year. It might be that the apparent polarization of work hours seen in cross-sectional studies is, in part, the result of workers having highly variable work hours—that is, working standard hours in some periods and long or short hours in other periods. If this were the case then the importance of hours polarization may have been overstated, and more attention should be paid to individual-level hours variation.

In this paper, we attempt to fill a gap in the Canadian job quality literature by investigating individual-level variability in work hours. We proceed in two stages. First, we describe the amount of individual-level hours variation observed among a panel of workers over the period from 1997 to 2001. In doing this, we estimate the share of the cross-sectional variance in work hours that is attributable to hours instability at the individual level, as well as describe the persistence of standard, long and short hours of work. We demonstrate that a significant share of workers had hours which varied from year to year, and that analysis of cross-sectional data provides an incomplete picture. We also show that more workers have a brush with long hours than cross-sectional results imply, although chronic periods of overwork are very rare.

Second, we examine the characteristics of workers defined according to their longitudinal working hours patterns. It may be that workers choose to work variable hours—working long hours in some years to pay for more leisure in others. We find that workers with lower job quality, non-standard workers, and low wage workers were all more likely than others to work more variable work hours. Furthermore, we find that workers with more unstable work hours have higher incidences of low income, are more likely to be found in the bottom quartile and decile of average earnings, and have higher incidences of stress and bad self-reported health. This indicates that it is unlikely that workers choose to work variable hours. Rather, it is more likely that most of these workers are unable to secure more stable employment.

In the next section, we discuss the literature on the polarization of work hours and its effects on well-being. In Section 3 we describe the data. In Section 4 we document the variability of annual hours at the individual level through the use of transition matrices and other simple descriptive statistics. In Section 5, we discuss the associations between various patterns of work intensity and other characteristics of job quality and well-being. We conclude by discussing the implications of these results for future research and policy development.

2. Background

Trends towards polarization of weekly hours worked are described in Sunter and Morissette (1994), Sheridan, Sunter and Diverty (1996), Hall (1999) and most recently in Pannozzo and Colman (2004). The stylized facts are that the share of workers working standard length workweeks, usually defined as from 35 to 40 hours per week, has declined over the past 2 business cycles. Comparing cyclical peak values, 47.4% of workers worked between 35 and 40 hours per week in 1978, 43.4% did so in 1989, and 39.4% did so in 2000.[1] In contrast, the share working less than 35 hours was steady between 1978 and 1989 but rose from 30.8% 1987 to 34.1% in 2000. The share working longer hours went from 23.0% in 1978 to 25.8% in 1989 and ended the 1990s at 26.4%. Similar trends were observed among prime-aged men, while for prime-aged women the trend might be better described as an increase in hours inequality, as the share of 25 to 44-year-old women with work hours equalling 41 or more rose from 10.8% in 1978 to 17.8% in 2000 with no corresponding rise in the share working less than 35 hours.[2]

This polarization in work hours has contributed to the view that job quality is on the decline in Canada. Part-time employment, defined as weekly work hours of less than 30 hours per week, forms a core of many definitions of non-standard work. Gunderson and Riddell (2000) show that the share of workers in non-standard work arrangements, comprising multiple job holders, the self-employed, short-tenured workers and part-time workers rose from 24% in 1976 to 31% in 1998, with the shares of part-time, self-employed, and multiple job holders rising in parallel over the period. Vosco, Zukewich and Cranford (2003) construct a typology of employment based on the concept of "precarious jobs" which combines the concepts of work hours, job permanence and self-employment, demonstrating a rise in precarious work over the early 1990s, and a strong association between part-time and temporary work, and an over-representation of women among the part-time. Most recently, Chaykowski (2005) relates non-standard work (defined as part-time and self-employed) to economic vulnerability (low pay and with lack of coverage by institutional protections), documenting an association between part-time work and economic vulnerability.

Moreover, there is a growing literature on the effects working hours arrangements have on well-being. These include costs associated with over work, underwork and unemployment which have been linked to other ill effects at the individual, family and society levels (Pannozzo and Colman, 2004; Higgins and Duxbury, 2002; Higgins, Duxbury and Johnson, 2004).

One aspect of well-being often related to work hours is access to a decent level of income. For example, hours polarization has been used to help understand the rise in weekly earnings inequality in Canada. Johnson and Kuhn (2004) provide a complete summary of the earlier literature, and reinforce the earlier results of Morissette, Myles and Picot (1994), Morissette (1995), and Picot

1. For the purpose of this comparison, we use the actual hours worked in all jobs series from the Labour Force Survey, which is the only series unaffected by changes in questionnaire design over the period. We include all workers (paid and self-employed). Since the share of workers with standard weekly hours follows a pro-cyclical path, we compare years where the standard hours values are at their cyclical high points. Data come from the Labour Force Historical Review, 2003, Statistics Canada, Catalogue number 71F0004XCB.

2. A recent paper by Rowe, Nguyen and Wolfson (2002) casts some doubt on the strength of these trends, arguing that some of the increase in non-standard work hours may be reflective of a lower tendency from survey respondents to approximate work hours.

(1998), by showing that the increase in weekly hours inequality plays an important part in increasing weekly earnings inequality. Research has also shown that many low-income workers cannot stitch together the equivalent of one full-year of full-time work (Crompton, 1995a). Individuals working short hours may be more likely to face poor employment standards, less likely to be unionized, and less protected against the probability of a layoff (Chaykowski, 2005). They also tend to have lower wages (Morissette, 1995) and lower skills (Johnson and Kuhn, 2004), and less access than others to employment insurance, pushing them away from social safety nets (Fleury and Fortin, 2004).

Work hours are also linked to well-being through the impact of work hours on stress. Stress is generally assumed to have a detrimental effect on well-being because of its negative effects on the psychological and physiological health of individuals (Wilkins and Beaudet, 1998). Not working, or not working enough, can be a stressor when individuals perceive that they cannot influence their own working conditions or when they see a disparity between low intellectual stimulation at the job and what workers think they would be capable of doing in a more challenging work environment. Stress may also emerge due to the association between low hours and low wages, or job instability (Scott, Tompa and Trevithick, 2004; Dolinschi Tompa and Bhattacharyya, 2004; Ferrie et al., 1998; Friedland and Price, 2003).

Moreover, individuals working too much may also be more likely to experience stress due to excessive demands on the job, the lack of leisure time taken, and the lack of quality time with family and friends (Frederick and Fast, 1996). In fact, in 2000, the most common source of stress among workers was "too many demands and/or too many hours at work" (Williams, 2003). Another report showed that people would feel happier if they spent less time on the job (Frederick and Fast, 2001). According to Higgins and Duxbury (2002, pp, 45-46), time in work is "the most reliable predictor of role overload, work-family conflict and perceived stress", where role overload means having too much to do and too little time to do it in.

In turn, work-life conflict is found to be an important determinant of self-perceived health (Higgins, Duxbury and Johnson (2004)). Workers, tired due to overwork, are found to have lower self-reported health (Cromptom 1995b) and shifting to longer working hours is also associated with increased daily smoking and weight gain (Shields, 1999). Workers with "lack of control over processes" (working substantial unpaid overtime hours) and income inadequacy are found to have lower functional health (Dolinschi, Tompa and Bhattacharyya, 2004), while underemployment is also associated with adverse health consequences (Scott, Tompa and Trevithick, 2004).

The polarization in work hours and the associated outcomes have led a number of commentators to investigate attitudes on working hours (Benimadhu, 1987; Morissette and Drolet, 1997) and emphasize the benefits and costs of alternative working arrangements (Frederick and Fast, 1996). Concern over what was regarded as the inequitable allocation of working hours led to the creation of the Advisory Group on Working Time and the Distribution of Work in 1994 whose report (Report of the Advisory Group on Working Time and the Distribution of Work, 1994) included the recommendation for "a new public policy priority that emphasises redistribution and reduction in working time" (p. 52). Torjman and Battle (1999) review the issues of unemployment, underemployment and job quality and propose that the federal government revise the Canada Labour Code to shorten the standard workweek and reduce the use of overtime and more generally

to promote the use of work sharing and expand the Canadian Work Sharing Program.[3] Pannozzo and Colman (2004), in developing the work hours component of the Nova Scotia Genuine Progress Index advocate a "decline in work hours for those who already have full-time work, who are working overtime, and who are working excessively long hours" (p. 442). This would occur through voluntary and negotiated changes among workers and employers, as well as through policy interaction.

This study differs importantly from other Canadian studies in that it examines not just cross-sectional work hours differences between individuals, but also year to year variation in work hours at the individual level. Up to now, there have been few Canadian studies of work hours instability,[4] although some U.S. evidence points to substantial variations in working patterns. For instance, Bluestone and Rose (1997) study year-to-year variation in work hours for individual workers using U.S. data. They find that, during the 1980s, 28% of prime-aged men had at least one period of significantly higher than standard annual hours and one period of significantly lower than standard hours. They argue that this group, which they call the "over worked and underemployed", faces a feast and famine cycle, "They work as much as they can when work is available to compensate for short workweeks, temporary layoffs, or permanent job loss that may follow" (p. 2).

Furthermore, this study extends the literature on the effects of hours polarization on worker well-being to include individual level hours instability. It is reasonable to extend the arguments around the detrimental effects on well-being of over and under work to include highly unstable work hours. Workers with highly unstable work hours may be under stress due to a lack of control over work intensity demands, and a lack of knowledge about future work availability or requirements. Further, variations in work hours would (for some) be caused by layoffs (a stressor), while for others, the constant threat of layoff can induce stress. Even if they work as many hours as possible in prosperous times, these workers may also be at risk of low income during periods characterized by short hours. In contrast, workers with a history of stable work hours may also be less likely to feel insecure about their job, and can expect to rely on a stable and predictable income stream.

3. The Canadian Work Sharing Program offers firms the opportunity to avoid layoffs by cutting work hours. Workers wages are then supplemented by employment insurance benefits. See Gray (2000) for details.

4. Rowe, Nguyen and Wolfson (2002) examine the stability of Canadian work hours using the Labour Force Survey and taking advantage of the 6-month rotational design to create short 6-month panels of worker histories. They find that changes in work hours in the order of 8 hours per week are normal, and that changes of 16 hours are also common, suggesting that there is substantial variation in the hours people work from week to week. Heavy workloads, it seems, are not necessarily persistent, and periods of heavy work are regularly interspersed with periods of lighter work for most workers. This study goes further by examining the individual variability of annual working hours over five years. The advantage of using annual work hours over weekly work hours is that people budget over longer time horizons than one week, and annual work hours will be more closely linked to important outcomes such as annual earnings and other indicators well-being.

3. Data

In this study, we examine the variability of individual work hours over time. We use the 1996 to 2001 longitudinal panel of the Survey of Labour and Income Dynamics (SLID)[5]. In this survey, respondents are asked in each year to describe their work schedules, which are then aggregated into a figure for annual working hours. In SLID, hours worked are collected by asking paid workers how many hours they "usually" get paid in a typical workweek and by asking self-employees how many hours they "usually" work each week. A typical workweek refers to the number of hours one should normally work during one week, including time off for holidays, paid sick or maternity leave and usual paid overtime, but excluding unusual paid overtime, and all unpaid hours. These questions are asked for each job held by the individual in the year (up to a maximum of six) and not for all jobs together. Unpaid absences are subtracted from the usual work hours schedule. The information about weekly hours worked in every job held during the year is put together with other information collected by the survey about weeks worked to compute individual estimates of annual hours worked.[6]

More specifically, we focus on a sample of approximately 8,100 individuals who were aged 25 to 54 in 1997 and worked on at least one occasion between 1997 and 2001.[7] This is reasonable because it restricts our focus on prime-aged individuals most willing to participate in the labour market. (Data from 1996 are used for certain lagged values in regressions. Thus, for the analysis in Section 5, individuals are also required to have worked in 1996, reducing the sample size to about 7,200.)

Because of the requirements of individuals to be in the sample over all six years, new immigrants who arrived after 1996, individuals who left the country before 2001, and individuals who were not physically located in the country at any point over the period were excluded from the sample.

Finally, self-employed workers were also excluded from the sample. Unlike paid workers, self-employed workers have the ability to choose their work hours more freely. Self-employment also includes a wide range of experiences and working conditions, making it difficult to draw clear inferences about the impact of working time on the well-being of such a wide variety of individuals. Consequently, this study includes paid workers only.[8]

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5. This corresponds to the most recent 6-year panel available in SLID. Our focus is on annual hours over the period 1997 to 2001, but we use the first year of the panel to identify some personal and employer characteristics among workers. In order to get consistent results, our focus remains on the same period even when lagged values are not required (where applicable, the inclusion of the additional year of data did not significantly affect the conclusions).

6. For more details about the collection of annual work hours in the SLID, see Bartman and Garneau (1998).

7. One-third of the potential panel members with positive weights had missing values for at least one of the five years for which we examine hours. A missing value indicates that the respondent was not interviewed or did not provide an answer. This is mostly because SLID gives positive weights to all the members of a household if data were collected for at least one of them for either the labour portion or income portion of the survey. We excluded these non-responding individuals from the sample, but adjusted the weights of the remaining sample upwards proportionately to compensate.

8. The inclusion of self-employed workers would not significantly affect the main findings of this report.

4. Work hours instability

Figure 1 shows the average annual hours worked over the 1997 to 2001 period for this panel of workers. Average annual hours rose from 1,667 to 1,756 between 1997 and 2001 underscoring the fact that this was a strong expansion period for the Canadian economy.

The cross-sectional distribution of annual work hours worked by this cohort in 2001 is shown in Figure 2. The distribution is characterized by response heaping at around 0, 1,040, 1,560, 2,040, 2,600 and 3,120 hours, corresponding to 0, 20, 30, 40, 50, and 60 hours per week worked for full-year schedules. Accordingly, we compute descriptive statistics for intervals of the work hours distribution, orienting these response spikes near to the centre of the intervals. Table 1 shows the intervals we use in this study.

Other interesting facts emerge from Table 2, which shows the cross-sectional distributions for 1997 and 2001 with hours divided among the intervals indicated above. Three findings are particularly worthy of attention. First, a substantial portion of workers in the sample worked standard hours (52.5% in 1997 and 57.2% in 2001). Second, the proportion of the sample working very long hours (2,400 or more hours per year) was relatively large, especially among men. Fully 8.0% of all paid workers and 11.4% of all paid men worked at least this many hours in 2001. Third, the distribution of work hours remained relatively stable over time, except for a small shift away from low part-time hours towards full-year full-time employment (especially among women). Thus, cross-sectional results might lead some to conclude that over work is chronically stable over time.

Table 3 presents a transition matrix of work hours, which compares, for each worker, the hours they worked in 1997 to the hours they worked in 2001. Among workers in this cohort, slightly more than half (50.6%) worked in the same interval of work hours in 2001 as they did in 1997. Consistent with the growing economy, more (27.7%) moved to a higher class of hours than moved to a lower class (21.7%). The fact that nearly one-half of workers changed hours classes over the five-year period indicates that there was substantial mobility in work hours.

Comparing transition matrices for men and women, the shares of workers working the same hours classes in 2001 as in 1997 was larger for men than women. Among men, 55.3% worked the same class of hours in 2001 and in 1997, while the same was true for 45.9% of women. Among those workers who changed classes, women were more likely to move up, with 30.6% of women moving up in hours classes compared to 24.9% of men.

Table 4 shows the transition matrix after adjusting the numbers so that the row cells sum up to 100 %. That is, these cell values represent the distribution of 2001 work hours within 1997 work hours classes. The distributions are the stickiest at the middle. Fully 74.4% of full-year full-time workers in 1997 were still full-year full-time workers in 2001. In addition, 35.2% of the overworked (2400 hours or more) in 1997 were again overworked in 2001. However, there was substantial mobility, especially away from the top of the distribution. Among the "overworked" in 1997, nearly two-thirds worked a shorter class of hours in 2001: 43.6% worked full-time hours in 2001, and 12.9% worked less than full-time hours. The flight from overwork was larger for women than men. Among women who worked more than 2,400 hours in 1997, 70.4% shifted down to standard or part-time hours schedules by 2001, compared to 52.0% among men.

Table 5 shows the persistence of "standard" (between 1,750 and 2,400 hours), long (at least 2,400 hours) and short hours (less than 1,750 hours) in the period from 1997 to 2001, ranging from one occurrence in the 5 years, to persistence over all 5 years. The "standard hours" category was the most stable working pattern among prime-aged workers, and especially among prime-aged men. Nearly one-third of all workers (and 40.2% of men) worked between 1,750 and 2,400 hours in all 5 years of the panel, and one in two workers in the panel worked standard hours in at least 4 years of the 5-year panel.

In contrast, long hours were much less persistent, although many did work long hours in one or more years. Cross-sectional results indicated that about 8.0% of the panel worked 2,400 or more hours in 2001; however, 20.3% of workers worked long hours in some year between 1997 and 2001, indicating that the share of workers having some experience working long hours is much larger than cross-sectional results suggest. Nevertheless, only 0.7% of the panel worked this much in all of the five years indicating that chronic over work is extremely rare. Men were more likely to be overworked than women.

Many workers (55.4%) worked fewer than 1,750 hours in at least one year between 1997 and 2001. The distribution of these workers was highly skewed. Fully 15.3% of these worked less than 1,750 hours in only one year, and almost as many (14.7%) worked fewer than 1,750 hours in all 5 years. However, these results hide significant differences along gender lines. Period-long spells of under work were much less prevalent among men (5.2%) than women (24.4%).

Table 6 shows the distribution of work hours arrived at when we examine hours averaged for each worker across the 1997 to 2001 period. This can be thought of as the variation in work hours that remains between people after the part due to within person instability is removed. Hours inequality is reduced under this approach, with fewer workers (5.6%) working 2,400 or more hours on a period-average basis than were seen in either 1997 (7.6%) or 2001 (8.0%) alone. The difference is greater for women than men, consistent with the lower persistence in long hours seen for women in the previous table.

How much do a typical individual's annual work hours vary? To answer this question we compute the mean absolute deviation (MAD) for each worker in our sample. Representing annual hours as h, the mean absolute deviation is given by the following formula:

$$MAD_i = \left[\sum_{t=1}^{5} abs(h_{it} - \bar{h}_i) \right] \Big/ 5 . \qquad (1)$$

In this formula, h_{it} represents the annual hours of individual i in year t, and $\bar{h}_i$ is the annual hours for that same person averaged across all five years. Hence MAD_i simply gives the average absolute difference between an individual's work hours in a typical year and his/her work hours in an actual year. A worker that had no variation in annual hours would have a mean absolute deviation of zero.

Percentiles of the distribution of mean absolute deviation are shown in Table 7. Considering all persons, the 25th percentile of mean absolute deviation is 65 hours, indicating that 75% of the sample typically diverted from their average hours by more than 1.5 standard weeks of work. More

striking, however, is that fully 50% of workers had an average variation in hours of more than 202 hours (5 weeks) and 25% had an annual hours variation of more than 10 weeks (443 hours). Furthermore, individual work hours variation was much higher among women. For example, the median woman worker typically experienced an average variation of 6.0 standard workweeks per year compared to about 4.2 weeks for men.

This discussion suggests that there are two sources of working hours inequality. One source derives from the fact that different workers can be characterized as having very different levels of work hours, even when their respective annual work hours are averaged over long periods of time. These can be thought of as *permanent* differences in working hours *between* people. The second source derives from the fact that, from year to year, workers experience variation in their own working hours. This can be thought of as *transitory* differences in working hours *within* people.

Both sources of working hours inequality are important for explaining annual earnings inequality. While one tends to lead to earnings inequality of a permanent nature, the other does not. The first reflects inequality in how hours are distributed among people. Other things being equal, between-people variation in working hours would underlie between-people inequality in earnings. To the extent that these are "permanent" differences in hours, this source of variation can lead to permanent differences in earnings inequality. The second reflects instability in how hours are distributed to workers over time. This instability in hours averages out over time, and so it does not contribute to permanent or ongoing differences in earnings inequality. However, this is not to say that it does not negatively reflect upon well-being, as discussed above.

To sort out how much of the cross-sectional variation in work hours can be attributed to individual instability, and how much can be attributed to inequality between individuals, we apply the method of variance decomposition developed by Gottschalk and Moffit (1994) and recently used by Morissette and Ostrovsky (2005) to decompose earnings inequality. If we observe N individuals across T years, the total variability of individual hours (h) across individuals and years is given by:

$$\sigma^2_{total} = \left(\frac{1}{NT-1}\right)\sum_{i=1}^{N}\sum_{t=1}^{T}\left(h_{it} - \bar{\bar{h}}\right)^2 \qquad (2)$$

This total variation in hours can be decomposed into a permanent and a transitory component. The permanent component reflects between individuals inequality, while the transitory component reflects within individuals instability.

The transitory variance is given by:

$$\sigma^2_{within} = \left(\frac{1}{N}\right)\sum_{i=1}^{N}\left[\left(\frac{1}{T-1}\right)\sum_{t=1}^{T}\left(h_{it} - \bar{h}_i\right)^2\right] \qquad (3)$$

Intuitively, σ^2_{within} is the average (across individuals) of individual specific variances (over time) of annual work hours.

The permanent variance is given by:

$$\sigma^2_{between} = \left(\frac{1}{N-1}\right)\sum_{i=1}^{N}\left(\bar{h}_i - \bar{\bar{h}}\right)^2 - \frac{\sigma^2_{within}}{T} \qquad (4)$$

where $\bar{h}_i$ is the average annual hours that person i worked between 1997 and 2001, and $\bar{\bar{h}}$ is the average of $\bar{h}_i$ across individuals. Hence, $\sigma^2_{between}$ represents the variance of annual hours among individuals, after averaging out the part of hours variation due to individual instability.

Table 8 shows the total variation in annual hours across persons and years, as well as the proportions of this variation attributable to individual level hours instability and the proportion due to between individuals inequality. Among all persons, fully 42.7% of the total variation in work hours can be attributed to individual level instability in hours, while the remaining 57.3% was attributable to inequality between individuals. This share was higher among men (50.8%) than women (43.1%). Altogether these estimates suggest that the amount of variance attributable to individual level instability is quite high in annual work hours.

5. Longitudinal patterns in work hours, job quality and well-being

One could argue that instability in work hours is not a cause for concern. For instance, individuals may choose variable work hours, working long hours in one year to "pay for" more leisure in the next. These workers' standard of living would not be affected as long as enough hours could be obtained over a long-term average. One can address this concern by splitting the sample of workers according to their working hours patterns and looking at their characteristics. If workers with high variability in work hours display characteristics associated with low-job quality or low well-being, then it becomes more difficult to argue that having highly variable annual work hours is a welfare-maximizing choice for these individuals.

Accordingly, we divide workers into 4 groups: (1) "always standard" (those with hours between 1,750 and 2,400 hours every year); (2) "overworked" (at least one year with more than 2,400 hours without ever going below 1,750); (3) "underemployed" (at least one year with less than 1,750 hours without ever going above 2,400) and (4) "hi-lo" (at least one year with more than 2,400 hours and at least another year with fewer than 1,750 hours). This last category identifies those workers whose working hours were particularly variable in which they were in the range of "overtime" work in some years and "part-time" work in others.[9]

Table 9 reports basic statistics for these four categories of workers. Almost one-third of workers worked "always standard" hours, averaging 2,027 hours per year (about 40 hours a week). Not surprisingly, these workers had very little instability in work hours over time. The 75th percentile of the mean absolute deviation was 60 hours, indicating that 75% of workers in this category typically diverted from their average annual hours by less than 1.5 standard weeks of work.

9. This structural grouping of workers resembles the groups identified in Bluestone and Rose (1997).

As many as 13.3% of workers worked more than 2,400 hours in at least one year without ever going under 1,750 hours. These "overworked" individuals worked more intensely than any other category, and did so by supplying on average 400 more hours per year than their counterparts in the "always standard" category. However, hours varied much more for overworked individuals. The 25% of them with the most variable work hours diverted from their average hours by about 8 standard weeks of work.

Fully 43.5% of workers in the sample worked fewer than 1,750 hours without ever going above 2,400 hours. These "underemployed" individuals formed the largest group of workers, and averaged approximately 34 weeks of full-time work per year over the five-year panel. Hours also varied quite substantially for these workers from one year to the next—more so than for workers in the "always standard" and "over worked" categories.

Finally, about one in twelve (7.8%) paid workers fell into the hi-lo group. On an annual basis, hi-lo workers supplied almost as many hours (1,978 hours) as workers who worked a standard full-year full-time schedule in each year. This is consistent with the idea that this group of workers, through averaging years of over work with years of underemployment, achieved approximately a standard work schedule. However, hi-lo workers maintained near-to-standard average hours at the cost of much more hours instability than workers in other categories. The statistics indicate that the median hi-lo worker typically experienced an annual variation of more than 10 weeks (420 hours). The hi-lo group also had more annual hours variation at the 25th, 50th and 75th percentiles than the standard, underemployed and overworked groups, indicating that this group of workers had much higher annual work hours instability.

Table 9 also displays results separately for men and women. Men were much more likely to work standard hours or above standard hours, while women were more likely to work below standard hours. Men and women were about equally likely to be in the hi-lo category.

In the remainder of this report, we compare various indicators of job quality and well-being across these four work hours intensity groups. Our objective is to determine if having highly variable work hours, which we proxy as being in the hi-lo category, is associated with having low-job quality or well-being, thereby making it difficult to argue that variable work hours is a choice for most. For readers who prefer a less structural approach, we also compare indicators of job quality and well-being to statistics directly describing the variability in annual work hours: the mean absolute deviation, and the coefficient of variation.

Table 10 shows the distribution of workers within work intensity categories according to various indicators of job quality. To many analysts, the labour market is divided into good jobs and bad jobs.[10] Good jobs have stable full-time hours, pension coverage and stability, while bad jobs have none of these. Good jobs also tend to be found at larger employers. To what extent is having a bad job associated with having highly variable work hours? In fact, all indicators of job quality in Table 10 are negatively associated with hours variability. Specifically, having a pension plan, being in a union, and working for a large firm are each associated with less hours variability, as measured by membership in the hi-lo group, or by the mean absolute deviation (MAD) or the coefficient of variation (CV) of hours. Working for a small firm is associated with more hours variability. Having

10. See Gunderson and Riddell (2002) for a recent review of the Canadian job quality literature.

a pension plan, union coverage or working for a large firm is also positively related to working standard hours, while having union coverage is also negatively related to being overworked.

Table 11 shows the distribution of workers across hours variability categories according to various other indicators of non-standard work or alternatively low-quality work.[11] Being a multiple job holder, a job changer, a non-manager, and having low wages are all associated with highly variable work hours.[12] Interestingly, being a top manager is also associated with having highly variable work hours, indicating that across management responsibilities there is a bi-polar relationship with hours variability. Multiple job holders, upper and top managers and top quartile wage earners were the most likely to be over worked, while lower and middle managers and workers in the top two quartiles of wages were most likely to have standard hours in all years. Table 11 also shows the distribution across working hours categories for self-employed workers. Although self-employed workers are excluded from the analysis everywhere else, it is instructive to examine them here as self-employed workers are often considered to be non-standard workers. In fact, self-employed workers have a very high incidence of variable work hours and over work.

Appendix Tables A1 and A2 describe hours variability according to a number of demographic and industry of employment background characteristics. Among the more interesting results is a higher rate of hi-lo work among university graduates compared to high school and post-secondary graduates, although the MAD of hours is higher for high school graduates, indicating that the various indicators of hours variability do send different signals (Table A1). Working hi-lo hours is lower for older workers, married men and women, workers in Quebec and recent immigrants, and higher for Atlantic Canada. Working hi-lo hours is higher in agriculture, forestry, fishing and hunting, construction and educational services, but lower in public administration and finance, insurance, real estate and rental and leasing.

Work hours and well-being

In this subsection, we describe the relationship between working hours patterns and well-being. We use several concepts to proxy well-being, including experiencing low income at least once over the period, having bottom quartile or bottom decile average earnings, having a high level of stress at least once over the period, or experiencing bad health at least once over the period.

Given the fact that we define having highly variable work hours as working low hours in at least one year (and high hours in another) and that it is also associated with low-job quality (including low wages), it is not surprising that we find that hours variability is associated with having one or more spells of low income over the period (Table 12). Fully 15.8% of hi-lo workers experienced at least one year of low income compared to just 3.3% of standard workers. More revealing is the fact that having hi-lo work is also associated with having low, average annual earnings over the period. Fully 24.4% of hi-lo workers had bottom quartile annual earnings (from all jobs, averaged between

11. While Table 10 showed variables which reasonably could be termed "determinants" of low-quality work, variables in Table 11 show a second group of job quality variables which themselves may be thought of as either determinants or outcomes, thus they are shown separately.

12. Having wages in the second quartile is actually the strongest determinant of hi-lo work, but both the MAD and the CV of work hours were highest for workers in the bottom quartile of wages.

1997 and 2001) compared to just 9.3% of standard workers. This indicates that hi-lo workers are not maintaining a particularly high standard of living through averaging periods of overwork and under work. It is also the case that hi-lo workers have a higher incidence of bottom decile average annual earnings than standard workers. Hi-lo work is more associated with low average earnings for men than women. While 12.9% of men have bottom quartile earnings, 18.6% of men in the hi-lo group have average earnings this low. As expected, bottom quartile and decile annual earnings are most concentrated among the underemployed group.

Table 13 shows the incidence of high stress and bad health among work hours categories and for workers with high- and low-mean absolute deviation of hours.[13] The incidence of stress is highest among those in the overworked category, but it is nearly as high in the hi-lo category. Moreover, compared to standard work hours, workers with hi-lo hours had much higher incidences of stress; 50.5% of hi-lo workers experienced stress compared to 37.6% of standard workers. Workers with a high MAD of hours were likewise found to have higher incidences of stress than workers with a low MAD of hours; 47.0% of workers with MAD greater than 320 hours (8 standard weeks) experienced high stress compared to 34.5% among workers with MAD less than 60 hours (1.5 standard weeks).

The incidence of bad health is also associated with working hours patterns. While the incidence of bad health is highest among workers who were underemployed, the incidence of bad health was nearly as high for hi-lo workers. Furthermore, hi-lo workers had a much higher incidence of bad health than workers who always worked standard hours; 19.7% of hi-lo workers experienced bad health compared to 15.6% of standard hours workers. Workers with a high MAD of work hours were likewise found to have a higher incidence of bad health than workers with a low MAD; 23.6% of workers with highly variable work hours had bad health compared to 15.2% among workers with hours that varied the least.

It might be that the relationship between working hours variability and stress or bad health are spurious. The associations seen in Table 13 could simply be the result of confounding factors. This possibility is investigated by a number of regressions designed to control for other factors and test the independent effect of working hours variability on stress and bad health.[14]

The dependent variables in the model are binary, taking the value of 1 if the worker reported being very stressed at some point between 1997 and 2001 (for the stress regression) or the worker reported being in fair or poor health at some point between 1997 and 2001, and 0 otherwise.

The models control for a number of background characteristics including demographic factors (age, education, sex, marital status, and immigration status), industry of employment (indicating industry of employment in 1996, measured across 2-digit NAICS categories) and job quality factors (pension plan, unionization, and firm size, all measured in 1996). The regressions also include a series of variables designed to assess the well-being of the individual at the beginning of the period. These well-being controls include a dummy variable indicating whether the person lived in a low-income

13. The measurement of stress and bad health in SLID is based on how respondents perceive themselves to be.

14. We do not perform corresponding regressions using low income or bottom quartile or decile earnings as a dependent variable, since work hours are clearly deterministically linked to income.

family in 1996, whether the person was very stressed in 1996, and whether the person reported being in bad health in 1996. Finally, the models include the mean annual hours observed over the 1997 to 2001 period, in order to account for the likelihood that stress and bad health are related to the levels of hours worked.

Hours variability is incorporated in three different ways (in separate models): with dummy variables indicating the structural categories described above (standard (the omitted category), overworked, underemployed and hi-lo); with the mean absolute deviation entered in levels to describe variation directly; or with the coefficient of variation of annual work hours entered in levels to describe hours variation directly.

Hence, these regressions test the impact of work hours variability on stress and bad health for a group of workers with otherwise equal characteristics at the beginning of the period. Moreover, controlling for lagged dependent variables allows us to demonstrate the effect of hours variability on well-being for workers who had equal levels of well-being at the beginning of the period.

Selected results for the models with stress as the dependent variable are shown in Tables 14 and 15[15]. Table 14 shows the results when work hours variability is entered as structural categories. It shows that after controlling for a wide variety of background characteristics, being overworked and being in the hi-lo group have about equal positive influences on stress. This is also true when men and women are examined separately. Table 15 shows that hours variability remains important when we enter it directly into the model, either as the CV or as the MAD of hours.

Tables 16 and 17 show results for the models where bad health is the dependent variable. The results for bad health are less consistent across models than for stress. Being in the hi-lo group is weakly associated with having bad health for all workers after other controls are added in, (column a). This effect appears more concentrated among women: the influence of being in the hi-lo group was insignificant for men (column b) but significant for women (column c). Having high mean absolute deviation of hours was associated with having bad health for men and women (columns a, b, and c of Table 17), but having a high CV of hours was only significant for men (column e).

It may be that the result for the CV of hours was not significant for women because the CV can be large even when the variance is small, as long as average hours are also small. We check this possibility by estimating a set of models which exclude observations with fewer than 200 hours. Alternatively, this result may reflect a higher possibility of reverse causality in the bad health case—specifically, it might be that bad health causes variability in work hours. We reduce this possibility by estimating a set of models with an alternative dependent variable which measures bad health only in 2001 (rather than at any time over the period). Both of these potential solutions tend to sharpen the results somewhat, making the coefficient for women's CV in column f larger and more significant (results not shown).

15. When using SLID, the standard errors from regressions are biased as they do not normally account for design effects. Unbiased standard errors can be estimated via bootstrap techniques. Standard errors in Tables 14 to 17 are unbiased bootstrap standard errors of the regressions based upon 1000 replications. Detailed results for all logit regression models are available from the authors upon request.

Table 18 shows predicted results from the stress and bad health models, evaluated at population averages (except for the mean hours variable which is set at the full-year full-time equivalent of 2040 hours). After controlling for other factors, including initial well-being, industry of employment, job quality, and demographics such as age, education, sex, marital status, and immigrant status, the results show that hi-lo workers had an incidence of stress that was 34% higher (50.6/37.9) than workers who always worked standard hours, making them just as stressed as the overworked. Under the alternate specification, it was found that workers with the highest mean absolute deviation in annual work hours had an incidence of stress that was 28% higher than those with the lowest hours variability. These "stress premiums" were comparable for men and women.

The table also shows that hi-lo workers had an incidence of bad health that was 23% (19.5/15.9) higher than standard hours workers, although this difference was much more pronounced for women than men. Women hi-lo workers were found to have an incidence of bad health that was 36% (20.0/14.6) higher than women standard hours workers. Similarly, workers with the highest mean absolute deviation of work hours were 29% (18.7/14.5) more likely to have bad health than those with the least hours variability, with this difference also more pronounced among women than men. Altogether these results clearly show that having variable work hours is related to lower levels of well-being.

6. Conclusion

Discussions related to work hours are typically driven by cross-sectional studies of work hours. Much less is known about the persistence of long hours or periods of underemployment. If hours are highly unstable for many workers, this raises the possibility that time crunch, or slack work, may be a smaller problem than the cross-sectional results imply. However, a lack of stability in work hours for individuals might itself be an indicator of low-job quality or low well-being. The lack of studies examining the amount and consequences of variation in working hours over time has been an important gap in our understanding of working time.

This paper examines the variability of work hours over time using longitudinal data for a sample of prime-aged paid workers from the Survey of Labour and Income Dynamics. It proceeds in two sections. The first section describes the amount of variability in work hours over the panel, and discusses what this contributes to our understanding of working hours inequality and the persistence of long work. This section makes three major contributions to our understanding of work hours:

(1) Workers face substantial variability in work hours; only about one-half of workers worked the same class of hours in 2001 as they did in 1997. In fact, the amount of variance attributable to individual level instability in work hours can be relatively large; up to 42% of the total variation seen in work hours was due to individual variation in work hours (more among men), with the remaining part due to differences in work hours between workers.

(2) More workers have a brush with long hours than cross-sectional results imply. However, long-term periods of overwork are very rare.
   - In a typical year, about 8% of workers worked more than 2,400 hours.
   - More than 20% of workers worked more than 2,400 hours in (at least) one year over a 5-year window.

- Very few (less than 1%), worked long hours in every year of the panel.
- Likewise, many more individuals worked less than full-year full-time hours in at least one year out of five than the cross-sectional results would imply.

(3) A significant minority of workers maintain approximately full-year full-time hours through averaging periods of overwork with periods of underemployment. These individuals, who account for about 8% of paid workers, face among the most variable of work hours.

The second section of this paper investigates the importance of variable work hours in understanding job quality and worker well-being. We define variable work hours in a number of different ways and show that:

(1) Workers with lower job quality as indicated by less pension plan coverage, lower unionization rates, and higher likelihood of working for a large firm had more unstable work hours.

(2) Workers in non-standard (such as being a multiple job holder, or self-employed) or low-wage work had more variable work hours. Non managers and top managers, but not lower- and middle-level managers, had more unstable work hours.

(3) Workers with highly variable work hours had higher incidences of low income, were more likely to be in the bottom quartile and decile of average earnings, and were more likely to report being very stressed or being in bad health than workers with less hours variation. (These associations with bad health were stronger among women than men.)

These results have several implications for research and policy development. First, there is a substantial body of research which examines the cross-sectional work hours distribution. Our results show that when one averages over a reasonable amount of time (five years), the inequality in work hours across workers is much less than one would be led to believe from cross-sectional results. Hence, research on working time inequality should pay more attention to individual-level hours instability.

Second, a number of policy prescriptions have been driven by the polarization of hours as seen in the cross-sectional results. However, few workers work long hours year after year. Moreover, for many, a period of overwork compensates for a period of under work, with the end result being an average full-year full-time work schedule. This lack of persistence in long work hours, plus the high level of individual hours variability undermines the equity-based arguments behind working time reduction policies, and forms a significant obstacle for their likelihood of success.

An important caveat to the above comment is that cross-sectional hours polarization has been *rising* over the past two decades. Even if the amount of persistent overwork is small, if it were rising then this would be an important development. Unfortunately, a sufficiently long panel to look at the issue of persistent work across multiple periods of time does not exist in Canada. However, a rise in inequality and non-standard work over the same period would, based on our results, imply a rise in individual hours instability. Hence, this suggests that some of the rise in cross-sectional hours inequality observed in recent decades may be partly driven by rising individual hours instability.

Third, a substantial body of research describes low-quality or non-standard work. Our results on hours instability reveal another dimension across which some workers fall behind others. Labour market policies designed to mitigate the hardships caused by low-quality or non-standard work may benefit from considering that these workers also tend to work unstable hours.

Finally, this research contributes to a growing body of work on the implications of work hours in work life balance. For example, Higgins and Duxbury (2002) point out that having too many work hours is the most important contributor to stress. This study contributes to the finding that variation in work hours is also an important determinant of stress and bad health. Research on the impact of hours of work on well-being or work-life balance could, in the future, also account for individual instability in working time. Policies designed to reduce working hours variability, and not just reduce working time, could also be to the benefit of workers.

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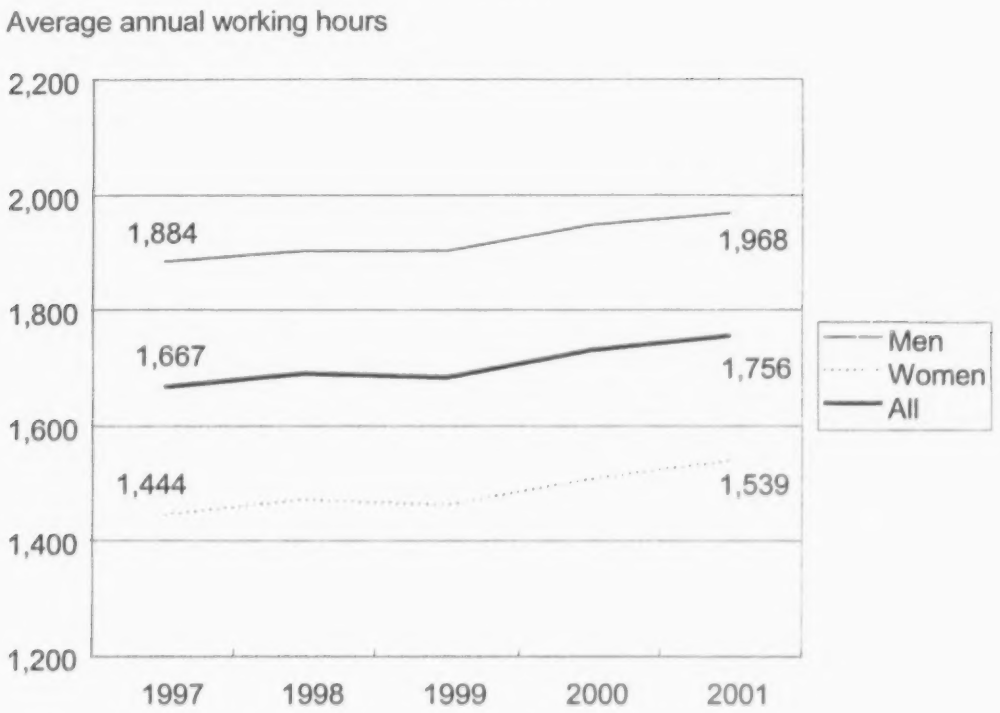
Figure 1 Average annual hours worked, 1997 to 2001



Source: Survey of Labour and Income Dynamics, Statistics Canada.

Figure 2 Annual hours worked distribution, 2001

Source: Survey of Labour and Income Dynamics, Statistics Canada.

Table 4 Percentage distribution of workers by category of hours worked in 1997 and 2001

Workers	Categories of hours in 1997	Categories of hours in 2001						
		0	1 to 1,199	1,200 to 1,749	1,750 to 2,199	2,200 to 2,399	2,400 and more	Total
All persons	No hours	11.3	36.4	23.1	24.2	2.5	2.5	100
	1 to 1,199	13.5	27.8	18.4	33.6	2.8	4.0	100
	1,200 to 1,749	8.7	18.2	24.2	41.1	2.7	5.1	100
	1,750 to 2,199	3.1	5.7	6.7	74.4	3.7	6.4	100
	2,200 to 2,399	2.6	5.1	7.2	58.5	14.5	12.0	100
	2,400 and more	2.0	3.4	7.5	43.6	8.3	35.2	100
Men	No hours	9.9	31.9	19.1	31.7	3.8	3.5	100
	1 to 1,199	10.1	13.2	11.4	52.6	4.6	8.1	100
	1,200 to 1,749	7.8	15.5	13.9	50.7	2.9	9.2	100
	1,750 to 2,199	2.4	3.7	4.3	77.2	5.0	7.4	100
	2,200 to 2,399	0.7	2.9	5.1	58.1	18.9	14.2	100
	2,400 and more	1.3	2.2	2.9	45.6	9.2	38.8	100
Women	No hours	11.9	38.6	25.1	20.5	1.9	2.0	100
	1 to 1,199	14.9	34.0	21.4	25.5	2.0	2.2	100
	1,200 to 1,749	9.1	19.5	29.0	36.6	2.6	3.2	100
	1,750 to 2,199	4.0	8.7	10.0	70.5	2.0	4.9	100
	2,200 to 2,399	6.5	9.4	11.4	59.3	5.8	7.6	100
	2,400 and more	4.1	7.2	21.7	37.4	5.5	24.1	100

Source: Survey of Labour and Income Dynamics, Statistics Canada.

Table 5 Persistence of standard, long and short hours, 1997 to 2001

Workers	# Years	% working between 1,750 and 2,400 hours (standard)	% working 2,400 hours and more	% working less than 1,750 hours
All persons	1	11.1	11.0	15.3
	2	10.9	4.6	9.1
	3	11.8	2.6	8.0
	4	17.3	1.4	8.3
	5	32.2	0.7	14.7
	Total	83.3	20.3	55.4
Men	1	9.2	14.8	15.6
	2	10.6	6.5	7.6
	3	12.1	3.8	6.2
	4	20.2	2.5	5.2
	5	40.2	1.2	5.2
	Total	92.3	28.8	39.8
Women	1	13.0	7.2	15.1
	2	11.2	2.7	10.6
	3	11.4	1.4	9.8
	4	14.4	0.4	11.4
	5	24.1	0.2	24.4
	Total	74.1	11.9	71.3

Source: Survey of Labour and Income Dynamics, Statistics Canada.

Table 6 Distribution of workers with hours averaged over the period from 1997 to 2001

Hours	All	Men	Women
Less than 1,199 hours	19.9	9.9	30.1
1,200 to 1,749 hours	17.9	12.2	23.7
1,750 to 2,199 hours	50.5	58.8	42.1
2,200 to 2,399 hours	6.1	9.8	2.3
2,400 hours and more	5.6	9.4	1.8

Source: Survey of Labour and Income Dynamics, Statistics Canada.

Table 7 Typical individual level variation (mean absolute deviation[1]) in annual hours, from 1997 to 2001

	All	Men	Women
25th percentile	65	52	85
50th percentile	202	167	239
75th percentile	443	411	467

1. Mean absolute deviation of annual work hours over the period from 1997 to 2001

Source: Survey of Labour and Income Dynamics, Statistics Canada.

Table 8 Variance decomposition of work hours, from 1997 to 2001

	All	Men	Women
Total variation	691,575	591,769	674,121
% associated with variations at the individual level	42.7	50.8	43.1
% associated with variation between individuals	57.3	49.2	56.9

Source: Survey of Labour and Income Dynamics, Statistics Canada.

Table 9 Descriptive statistics per category of work intensity

	Always between 1,750 and 2,400 hours (standard)	At least once above 2,400, never under 1,750 (overworked)	At least once under 1,750, never above 2,400 (under employed)	At least once above 2,400 and at least once under 1,750 (hi-lo)	All categories of work intensity
Men and Women					
Share (%)	35.4	13.3	43.5	7.8	
Average hours	2,027	2,427	1,364	1,978	1,788
Mean absolute deviation [1]					
25th percentile	0	125	112	266	31
Median	25	188	233	420	125
75th percentile	60	317	417	631	319
Men					
Share (%)	42.6	20.7	28.4	8.3	
Average hours	2,052	2,440	1,494	2,002	1,970
Mean absolute deviation [1]					
25th percentile	0	125	132	268	17
Median	25	188	267	413	103
75th percentile	62	319	466	637	288
Women					
Share (%)	27.5	5.2	60.0	7.2	
Average hours	1,983	2,371	1,295	1,948	1,588
Mean absolute deviation [1]					
25th percentile	0	133	106	266	37
Median	25	185	222	422	147
75th percentile	56	313	396	626	343

1. Mean absolute deviation of annual work hours over the period 1997 to 2001

Source: Survey of Labour and Income Dynamics, Statistics Canada.

Table 10 Percentage distribution of workers within work intensity categories, by 1996 job quality characteristics

	Always between 1,750 and 2,400 hours (standard)	At least once above 2,400, never under 1,750 (over worked)	At least once under 1,750, never above 2,400 (underemp.)	At least once above 2,400 and at least once under 1,750 (hi-lo)	MAD[1]	CV[2]
All	35.4	13.3	43.5	7.8	204	0.282
Pension plan[3]	46.3	14.2	33.1	6.4	173	0.199
Union coverage[3]	44.8	9.2	38.9	7.1	169	0.213
Small firm (less than 20 employees)[3]	21.7	12.5	56.0	9.7	246	0.390
Large firm (more than 1000 employees)[3]	43.8	14.1	35.6	6.5	179	0.230

1. MAD = Mean absolute deviation of annual work hours over the period from 1997 to 2001
2. CV = Coefficient of variation of annual work hours over the period from 1997 to 2001
3. Based on the highest earning job in 1996

Source: Survey of Labour and Income Dynamics, Statistics Canada.

Table 11 Percentage distribution of workers within work intensity categories, by other indicators of non-standard or low-quality work

Categories	Always between 1,750 and 2,400 hours (standard)	At least once above 2,400, never under 1,750 (over worked)	At least once under 1,750, never above 2,400 (under employed)	At least once above 2,400 and at least once under 1,750 (hi-lo)	MAD[4]	CV[5]
All	35.4	13.3	43.5	7.8	204	0.282
Multiple job holder[1]	8.4	19.9	47.4	24.4	333	0.385
Job changer[1]	18.9	14.4	51.5	15.2	260	0.326
Non-manager [2]	32.5	9.0	50.1	8.4	208	0.319
Lower management[2]	48.4	17.8	28.8	5.0	162	0.160
Middle management[2]	46.8	24.9	23.1	5.3	171	0.156
Upper management[2]	39.8	35.7	20.5	3.9	208	0.188
Top management [2]	33.3	34.9	22.9	8.9	235	0.196
Wages in bottom quartile[3]	15.4	6.3	69.9	8.4	272	0.526
Wages in second quartile[3]	31.4	9.7	49.6	9.3	219	0.290
Wages in third quartile[3]	45.9	13.5	33.5	7.2	164	0.190
Wages in top quartile[3]	43.2	21.2	28.9	6.7	179	0.191
Self-employed[1]	5.8	37.7	35.0	21.6	344	0.370

1. At some point between 1997 and 2001
2. Based on the highest earning job in 1996
3. Hours weighted average across all jobs held between 1997 and 2001
4. MAD = Mean absolute deviation of annual work hours over the period from 1997 to 2001
5. CV = Coefficient of variation of annual work hours over the period from 1997 to 2001

Source: Survey of Labour and Income Dynamics, Statistics Canada.

Table 17 Regression results, bad health on work hours variability

	Men and women	Men	Women	Men and women	Men	Women
	a	b	c	d	e	f
Intercept	-0.679	-0.687	-0.772	-0.963+	-1.359~	-0.814
	(0.416)	(0.613)	(0.537)	(0.462)	(0.699)	(0.598)
Mean absolute deviation[1]	0.637*	0.536+	0.712+	...	...	...
	(0.192)	(0.266)	(0.285)	...	...	...
Coefficient of variation[2]	...	...	...	0.384+	0.649+	0.256
	...	...	...	(0.151)	(0.268)	(0.202)
Average hours 1997-2001	Yes	Yes	Yes	Yes	Yes	Yes
Demographic controls	Yes	Yes	Yes	Yes	Yes	Yes
Industry controls	Yes	Yes	Yes	Yes	Yes	Yes
Job quality controls	Yes	Yes	Yes	Yes	Yes	Yes
Well-being controls	Yes	Yes	Yes	Yes	Yes	Yes
# of observations	7,242	3,581	3,661	7,242	3,581	3,661

(1) Mean absolute deviation of annual work hours over the period 1997 to 2001
(2) Coefficient of variation of annual work hours over the period 1997 to 2001
Complete regression results are available on request.
Standard errors (in parenthesis) were computed by using bootstrap estimation techniques.
*, +, ~ indicate significance at the 1%, 5% and 10% levels respectively.
... not applicable
Source: Survey of Labour and Income Dynamics, Statistics Canada.

Table 18 Predicted incidence of high stress and bad health by work hours intensity, men and women

	Work intensity groups model				Hours variability models	
	Always between 1,750 and 2,400 hours (standard)	At least once above 2,400, never under 1,750 (over-worked)	At least once under 1,750, never above 2,400 (under employed)	At least once above 2,400 and at least once under 1,750 (hi-lo)	Low MAD[1]	High MAD[2]
High stress in at least one year						
All	37.9	51.7	40.8	50.6	39.3	50.5
Men	35.6	53.3	38.9	47.1	38.1	49.5
Women	41.9	53.2	43.6	54.4	42.0	53.0
Bad health in at least one year						
All	15.9	14.7	15.0	19.5	14.5	18.7
Men	17.1	15.7	15.8	18.7	15.5	19.2
Women	14.6	16.6	13.7	20.0	13.7	18.1

1. Low MAD = Mean absolute deviation of annual work hours over the period from 1997 to 2001 of less than 60 hours
2. High MAD = Mean absolute deviation of annual work hours over the period of more than 320 hours
Source: Survey of Labour and Income Dynamics, Statistics Canada.

Appendix: Supplementary tables

Table A1 Work intensity categories and hours variability, by worker characteristics

Worker characteristics	Always between 1,750 and 2,400 hours (standard)	At least once above 2,400, never under 1,750 (over-worked)	At least once under 1,750, never above 2,400 (under employed)	At least once above 2,400 and at least once under 1,750 (hi-lo)	MAD[2]	CV[3]
All workers	35.4	13.3	43.5	7.8	209	0.281
Personal characteristics:						
Age[1]						
25 to 34	30.9	13.3	47.6	8.2	233	0.319
35 to 44	39.3	13.7	38.9	8.1	186	0.232
45 to 54	35.4	12.9	44.9	6.8	216	0.314
Sex:						
Men	42.6	20.7	28.4	8.3	200	0.216
Women	27.5	5.2	60.0	7.2	217	0.346
Marital status[1]						
Single women, with kids	31.2	3.9	56.8	8.1	212	0.352
Single women, no kids	33.0	9.0	49.5	8.5	207	0.304
Single men, with kids	48.0	23.2	19.1	9.7	193	0.211
Single men, no kids	35.2	12.8	43.3	8.8	224	0.313
Married women, with kids	25.4	3.4	64.5	6.7	212	0.343
Married women, no kids	26.5	7.9	58.6	7.0	244	0.382
Married men, with kids	45.4	24.2	22.2	8.3	193	0.186
Married men, no kids	43.1	20.1	29.6	7.3	204	0.229
Region[1]						
Atlantic	32.9	12.3	44.8	10.1	228	0.309
Quebec	37.9	8.0	48.6	5.5	196	0.300
Ontario	34.4	16.2	41.4	8.0	205	0.259
Prairies	36.3	15.0	39.1	9.6	204	0.269
British Columbia	33.9	14.0	44.0	8.1	215	0.273
Level of schooling[1]						
High school or less	35.3	11.8	45.4	7.5	221	0.316
Some post-secondary	36.7	12.4	43.9	7.0	199	0.268
University graduates	33.1	16.8	40.2	9.9	210	0.255
Immigration status						
Arrived between 1987 and 1996	35.9	11.2	47.8	5.1	188	0.254
Arrived before 1987	39.0	15.2	35.9	9.9	203	0.263
Canadian-born	34.9	13.2	44.4	7.6	210	0.284

1. As of 1997
2. MAD = Mean absolute deviation of annual work hours over the period from 1997 to 2001
3. CV = Coefficient of variation of annual work hours over the period from 1997 to 2001

Source: Survey of Labour and Income Dynamics, Statistics Canada.

Table A2 Work intensity categories and hours variability, 1996, per industry[1]

Categories	Always between 1,750 and 2,400 hours (standard)	At least once above 2,400, never under 1,750 (over-worked)	At least once under 1,750, never above 2,400 (underemp.)	At least once above 2,400 and at least once under 1,750 (hi-lo)	MAD[2]	CV[3]
All	35.4	13.3	43.5	7.8	209	0.281
Agriculture, Forestry, Fishing and Hunting	18.1	18.7	42.6	20.6	318	0.399
Mining, Oil and Gas Extraction and Utilities	52.0	12.8	25.8	9.4	187	0.184
Construction	26.0	17.7	43.5	12.8	250	0.313
Manufacturing	44.2	15.4	34.1	6.4	199	0.243
Wholesale Trade	36.5	21.1	36.2	6.2	209	0.263
Retail Trade	31.4	10.0	53.6	5.0	211	0.324
Transportation and Warehousing	32.4	22.9	33.9	10.8	222	0.250
Information and Cultural Industries	49.9	14.2	33.8	2.2	189	0.226
Finance, Insurance and Real Estate and Rental and Leasing	34.3	14.0	47.7	4.0	186	0.249
Professional, Scientific and Technical Services and Management of Companies and Enterprises	33.2	16.1	44.3	6.5	190	0.247
Administrative and Support, Waste Management and Remediation Services	22.8	7.7	58.4	11.1	280	0.518
Educational Services	24.6	12.8	49.0	13.6	226	0.300
Health Care and Social Assistance	30.2	6.3	56.9	6.6	194	0.281
Arts, Entertainment and Recreation and Accommodation and Food Services	16.4	11.8	63.5	8.3	285	0.475
Other Services (except Public Administration)	32.5	11.7	47.6	8.2	220	0.337
Public Administration	52.5	9.9	31.8	5.8	162	0.208
All	35.4	13.3	43.5	7.8	318	0.399

1. Based on the highest earning job in 1996
2. MAD = Mean absolute deviation of annual work hours over the period from 1997 to 2001
3. CV = Coefficient of variation of annual work hours over the period from 1997 to 2001

Source: Survey of Labour and Income Dynamics, Statistics Canada.

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